Severity of Extreme Droughts in Sacramento and San Joaquin Valley

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Numerous multiyear droughts have occurred in California last century: 1912-13, 1918-20, 1922-24, 1929-34, 1947-50, 1959-61, 1976-77, and 1987-92. In order to provide water supply reliability, major reservoirs are designed to maintain and deliver carryover storage through several years of drought. The 1929-34 drought established the criteria commonly used to design the storage capacity and water yield of large Northern California reservoirs. Many reservoirs built since this drought were sized to maintain a reliable level of deliveries should a repeat of the 1929-34 hydrology occur. Even a single critical runoff year such as 1977 can be devastating to water users with limited storage reserves, who are more dependent on annual runoff. Following table compares the severity of recent droughts with the 1929-34 drought in the Sacramento Valley and San Joaquin Valley.

Drought Period	Sacramento Valley Runoff		San Joaquin Valley Runoff	
	(maf/yr)	(% Average 1901-96)	(maf/yr)	(% Average 1906-96)
1929-34	9.8	55	3.3	57
1976-77	6.6	37	1.5	26
1987-92	10.0	56	2.8	47

Groundwater supplies about 30 percent of California's urban and agricultural applied water use. In drought years when surface water supplies are reduced, groundwater supports an even greater percentage of use, resulting in declining groundwater levels in many areas. For example, during the first five years of the 1987-92 drought, groundwater extractions exceeded groundwater recharge by 11 million acre-feet in the San Joaquin Valley. Drawing down groundwater reserves in drought years is analogous to reservoir carryover storage operations.

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